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Two new pauropod species from Central Amazonia (Myriapoda: Pauropoda: Pauropodidae)

by

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Abstract

Two new species of Pauropoda from Lago Janauarí, near Manaus, *Allopauropus janauariensis* n.sp. and *Scleropauropus angularis* n.sp. are here described.

Keywords: **Pauropoda, soil fauna, secondary forest, Amazonia, Neotropics, Brazil.**

Resumo

Descreve-se duas novas espécies de Pauropoda do Lago Janauarí, perto de Manaus: *Allopauropus janauariensis* n.sp. e *Scleropauropus angularis* n.sp.

Introduction

During his investigations of the ecology of Central Amazonian ecosystems Professor Dr. Joachim Adis, Plön, and his collaborators have collected extensive material of the soil fauna of Central Amazonia. Thanks to them it has been possible to describe 51 new species in Pauropoda from there (SCHELLER 1994, 1997, 1999).

389 specimens were extracted from soil samples from Lago Janauarí in Central Amazonia, and among them two species new to science were found. The study site at Lago Janauarí, 03°20'S, 60°17'W, is situated on a spit between the Rio Negro and the Rio Solimões about 10 km from Manaus across the river. The region is influenced by blackwater of the Rio Negro during low water level and by whitewater of the Rio Solimões during the high water period. The studied specimens come from a secondary upland forest. The soil consists of clay, predominantly montmorillonite, representing alluvial deposits of the Rio Solimões. The material was collected in 0-14 cm depth in the rainy season in March 1996 and was extracted from the soil following a modified method of KEMPSON et al. (KEMPSON et al. 1963; ADIS 1987).

Descriptions of new species

Notes

* Abbreviations: ad. ... and subad. ..., an adult or a subadult specimen with the number of pairs of legs indicated; juv. ..., a juvenile specimen with the number of pairs of legs indicated.

** Length of body except antennae, range of variation in adult paratypes given in brackets.

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Order Tetramerocerata
Family Pauropodidae
Subfamily Pauropodinae
Genus *Allopauropus* SILVESTRI, 1902
Subgenus *Decapauropus* REMY, 1957
Allopauropus (D.) janauariensis n.sp. (Figs. 1-11)

Type locality. - Brazil, Manaus, Lago Janauarí, 03°20'S, 60°17'W, secondary upland forest, loc. K13LJ.

Type material. - Holotype, ad. 9*(♀), locality as above, 7.III.1996, leg. J. ADIS et al. Holotype in the INPA collections.

Paratypes: Same data as holotype, 2 ad. 9 (♂, sex?); ibidem, 16 ad. 9 (5♂, 11♀), loc. K28LJ; ibidem, 2 ad. 9 (♂), loc. K33LJ, leg. J. ADIS et al. Paratypes in the INPA collections. - In all 21 specimens.

Etymology. A latinization of the name (Lago) Janauarí.

Description

Length. - (0.54-)0.90 mm**.

Head (Fig. 1). - Tergal and lateral setae of medium length. Setae thin, subcylindrical, blunt, striate. Relative lengths of setae, 1st row: a_1=10, a_2=12(-13); 2nd row: a_1=(7-)8(10), a_2=(15-)16(-19), a_3=?(10-11); 3rd row: a_1=(11-)12(-15), a_2=(13-)14(-17); 4th row: a_1=(7-)8(-12), a_2=(18-)20(-21), a_3=(20-)24(-26), a_4=(17-)18(-20); lateral group (Fig. 2): l_1=(28-)30(-40), l_2=(26-)28(-33), l_3=(25-)27(-32). The ratio a_1 / a_1-a_1 is in 1st row 0.9(-1.0), in 2nd row (1.9-)2.0(-2.1), in 3rd row ?(0.8) and in 4th row (1.8-)2.0. Temporal organs broadest in anterior part, very narrow posteriorly, 1.3(-1.4) times as long as their shortest distance apart; no pistil; small pore at posterior margin at a level of l_1 (Fig. 2). Head cuticle glabrous.

Antennae (Fig. 3). - Segment 4 with 4 cylindrical, striate and blunt setae. Relative lengths of setae: p = 100, p' = (41-)43(-46), p'' = 28(-30), r = (48-)50(-54). Tergal seta p (1.1-)1.2(-1.3) times as long as tergal branch t. The latter short, somewhat fusiform, (1.8-)2.0(-2.1) times as long as its greatest diameter and about as long as sternal branch s which is (1.4-)1.5(-1.6) times as long as its greatest diameter and with its anterodistal corner strongly truncate. Seta q as seta r on 4th segment, 1.1(-1.2) times as long as s. Relative lengths of flagella (base segments included) and base segments alone: F_1=100, bs_1=5(-6); F_2=27(-33), bs_2=4; F_3=(70-)71(-76), bs_3=8. The F_1 (5.0-)5.2(-6.0) times as long as t, F_2 and F_3 1.4(-1.9) and 3.5(-4.5) times as long as s respectively. Distal calyces very small, somewhat flattened; distal part of flagella axes strongly widened on F_1, least on F_2. Globulus g (1.3-)1.6 times as long as greatest diameter, (11-)12 bracts, capsule spherical; length of g (0.6-)0.7 of the length of s, diameter (0.8-)0.9 of greatest diameter of t. Antennae glabrous.

Trunk. - Setae of collum segment (Fig. 4) simple, cylindrical, striate, blunt; sublateral one about twice longer than submedian one; sternite process triangular, without anterior incision; appendages wide with low flat caps. Process and appendages glabrous.

Setae on tergites of medium lengths, subcylindrical, striate, blunt, their distribution not studied in detail. There are 4+4 setae on tergite I and 4+2 on VI. Length of submedian posterior setae on tergite VI (Fig. 5) 0.3 of their distance apart, and 0.5(-0.6) of the length of pygidial a_1.

Bothriotricha. – With straight simple axes; T_3 (Fig. 6) with distal swelling which is subcylindrical, (4.5-)4.8 times as long as wide, almost 0.2 of the length of bothriotrix and with short dense erect pubescence; axis below endswelling with distinct oblique pubescence. The T_1-T_2 and T_4-T_5 with very thin axes and very short, simple, oblique-erect pubescence hairs. Relative lengths of bothriotricha: T_1=100, T_2=107(-109), T_3=(94-)102(-104), T_4=117(-125), T_5=(130-)141(-148).

Genital papillae (paratypes only, fig. 9). – They are subconical, sides rounded, glabrous, 1.3(-1.4) times as long as their greatest diameter; distal seta thin, 0.4(-0.5) of the length of papillae.

Legs. – Legs short. Distal organ of tarsus stalked (Fig. 8). Setae on coxa and trochanter of legs 1-9 simple (Fig. 7), subcylindrical, striate-annulate, blunt. Coxal seta of leg 2 in male resembles coxal setae of the other legs. Tarsus of leg 9 short, tapering, (2.9-)3.2 times as long as its greatest diameter; setae striate, proximal one thin, cylindrical, 0.2 of the length of tarsus and 0.7(-0.8) of length of distal seta. Cuticle of tarsus glabrous.

Pygidium (Fig. 10). Tergum. - Posterior margin between st straight. Relative lengths of setae: a_1=100, a_2=(61-)67(-69), a_3=(184-)208(-209), st=(76-)83. All setae tapering, all but st glabrous, a_2 and a_3 curved inwards, a_1 and st straight, the former directed upwards and backwards, the latter converging and with oblique pubescence on distal 2/3. Distance a_1-a_1 (1.6-)1.7(-1.8) times as long as a_1; distance a_1-a_2 about twice longer than distance a_2-a_3; distance st-st 2.3(-2.5) times as long as st and (1.0-)1.1 times as long as distance a_1-a_1. Cuticle between st with sparse pubescence.

Sternum. - Posterior margin with broad indentation between b_1, two small posterior lobes outside the anal plate. Relative lengths of setae (a_1=100): b_1=(247-)300(-309), b_2=(83-)100(-109). These setae thin, tapering; b_1 striate, b_2 glabrous, almost straight and somewhat diverging. The b_1 1.4 times as long as their distance apart; b_2 0.7(-0.8) of the distance b_1-b_2.

Anal plate (Figs. 10-11) cordate, (1.6-)1.8 times as long as broad, broadest in anterior half, anteriorly strongly constricted, almost pedunculate, protruding posteriorly into a triangle with almost straight sides. Two cylindrical, blunt, diverging appendages project from posterior part of sternal side; appendages 0.4(-0.5) of the length of plate and with distinct oblique pubescence; anterior half of sternal side glabrous, pubescence long on distal half of tergal side.

Affinities. *A. janauariensis* is a slender and short-legged species, which is clearly distinguishable from other species in the subgenus by the cordate anal plate, proportionately large antennal globulus, long and straight styli and by the temporal organs, narrowing posteriorly. However, the general shape of the anal plate shows similarities to that in *A. socius*, *A. nemoralis* and *A. lupiger*, all described by REMY from the Ivory Coast (1948), Madagascar (1956) and Mauritius (1959), but it is proportionately longer and with broader base in these species.

The new species seems not to be closely related to any of the Amazonian species described up to now.

Subfamily Scleropauropodinae
Genus *Scleropauropus* SILVESTRI, 1902
Subgenus Scleropauropus s. str.
Scleropauropus angularis n.sp. (Figs. 12-21)

Type locality. - Brazil, Manaus, Lago Janauarí, 03°20'S, 60°17'W, secondary upland forest, loc. K24LJ.

Type material. - Holotype, ad. 9 (♀), locality as above, 7.III.1996, leg. J. Adis et al. Holotype in the INPA collections.

Paratypes: Same data as holotype, 1 ad. 9 (♂), loc. K29LJ; ibidem, 1 ad. 9 (♂), loc. K30LJ; ibidem, 2 ad. 9 (♂), loc. K33LJ, leg. J. Adis et al. Paratypes in the INPA collections. - In all 5 specimens.

Etymology. From Latin *angulus* = corner, angle; *angularis* = having angles, referring to the anal plate.

Description

Length. - (0.91-)0.97 mm.

Head (Fig. 12). – Submedian tergal setae of medium length, sublateral and lateral ones fairly long. Setae thin, cylindrical, blunt, striate. Relative lengths of setae, 1st row: a_1=10, a_2=12; 2nd row: a_1=(11-)15, a_2=(20-)28, a_3=(16-)25; 3rd row: a_1=(10-)12(-13), a_2=(12-)17; 4th row: a_1=(11-)13, a_2=(19-)25, a_3=(23-)28, a_4=(21-)30); lateral group (Fig. 13): l_1=(19-)24, l_2=19(-20), l_3=(18-)20. The ratio a_1 / a_1-a_1 is in 1st row 0.8(-1.0), in 2nd row (0.8-)0.9, in 3rd row 1.0 and in 4th row 0.8. Temporal organs broadest in anterior part, 1.3 times as long as their shortest distance apart; no pistil; very small pore at posterior margin at a level of l_1 (Fig. 13). Head cuticle and temporal organs indistinctly granular.

Antennae (Fig.14). - Segment 4 with 5 striate setae, 4 are cylindrical, *r* subcylindrical. Relative lengths of setae: *p*=100, *p'*=(59-)71, *p''*=(52-)56, *r*=(48-)52, *u*=(7-)10. The *p'''* a rudimentary knob only. Tergal seta *p* 1.0(-1.1) times as long as tergal branch *t*. The latter somewhat fusiform, (3.6-)4.2 times as long as its greatest diameter and about as long as sternal branch *s* which is 2.0(-2.1) times as long as its greatest diameter and with its anterodistal corner strongly truncate. Seta *q* as seta *p* on 4th segment, 1.2(-1.3) times as long as *s*. Relative lengths of flagella (base segments included) and base segments alone: F_1=100, bs_1=4(-5); F_2=(30-)34, bs_2=3(-4); F_3=75(-84), bs_3=5. The F_1 (3.3-)3.7 times as long as *t*, F_2 and F_3 (1.4-)1.8 and (3.9-)4.0 times as long as *s* respectively. Distal calyces subhemispherical, distal part of flagella axes somewhat widened. Globulus *g* 1.3 times as long as greatest diameter, 8(-9) bracts, capsule flattened; length of *g* 0.4 of the length of *s*, diameter (0.7-)0.8 of greatest diameter of *t*. Antennae glabrous.

Trunk. - Setae of collum segment (Fig. 15) simple, cylindrical, striate, blunt; sublateral one about (2.7-)2.9 times as long as submedian one; sternite process with anterior half very narrow, cleft deeply and with parallel lateral sides; appendages wide with flat caps. Process and caps glabrous, appendages with short pubescence.

Setae on anterior tergites of medium length, cylindrical, striate, blunt; on posterior tergites tapering, even pointed. There are 4+4 setae on tergite I, 6+6 on II-IV, 6+4 on V and 4+2 on VI. Length of submedian posterior setae on tergite VI (Fig. 16) 0.7 of their distance apart and 0.7(-0.8) of the length of pygidial a_1.

Bothriotricha. – With simple straight axes; T_3 (Fig. 17) thickest. The T_1-T_2 and T_4-T_5 with very thin axes and very short, simple, oblique-erect pubescence hairs. Relative lengths of bothriotricha: T_1=100, T_2=(119-)122, T_3=(103-)107, T_4=132(-135), T_5=140(-151).

Genital papillae (paratypes only, Fig. 20). – They are short, glabrous, outer sides rounded, inner almost straight; length 1.7 times as long as greatest diameter; distal seta thin, 0.4 of the length of papillae.

Legs. – Setae on coxa and trochanter of leg 9 (Fig.18) furcate, branches subsimilar, cylindrical, striate, blunt. More anteriorly these setae are simple without secondary branches. Coxal seta of leg 2 in male simple (Fig. 20), cylindrical, striate. Tarsus of leg 9 (Fig. 19) tapering, narrow in distal 2/3, (3.7-)3.9 times as long as its greatest diameter; setae proportionately long, proximal one almost erect, tapering, pointed, indistinctly striate distally, distal one cylindrical, striate, blunt; proximal seta (0.3-)0.4 of the length of tarsus and (1.4-)1.7 times as long as distal seta. Cuticle of tarsus with very short and indistinct pubescence on distal 2/3.

Pygidium (Fig. 21). Tergum. - Posterior margin with low rounded bulge between *st*. Relative lengths of setae: a_1=100, a_2=94(-97), a_3=136(-147), *st*=14(-17). The a_1, a_2 and a_3 long, thin, almost straight, tapering, pointed, somewhat diverging, and with very short pubescence on distal half; *st* short, clavate, with short pubescence, converging. Distance a_1-a_1 0.6 of the length of a_1; distance a_1-a_2 about 1.5 times as long as a_2-a_3; distance *st*-*st* (3.0-)4.2 times as long as *st* and as long as distance a_1-a_1. Cuticle almost glabrous.

Sternum. - Posterior margin between b_1 with very broadly V-shaped indentation and a median posterior, trapezoid lobe below the base of the anal plate; trapezoid lobe with median posterior incision between two small posterior lobes. Relative lengths of setae (a_1=100): b_1=76(-80), b_3=15(-17). These setae thin, striate, b_1 tapering, b_2 cylindrical, blunt. The b_1 0.9 of their distance apart; b_3 almost 0.2 of their distance apart.

Anal plate narrowest anteriorly, cuneate, (1.4-)1.5 times as long as broad, lateral margins somewhat concave, posterior margin with two parallel appendages which are directed posteriorly; appendages 0.7 of the length of the plate, with conical base and distal 2/3 subcylindrical, blunt, with short oblique pubescence.

Affinities. *A. angularis* may be closest to *S. litoreus* REMY & ROLLET from Madagascar (REMY & ROLLET 1960).The two species have similarities in some antennal characters and the shape of the setae of the pygidial tergum and in the anal plate. They are distinguished by the shape of the sternal antennal branch (with distinct anterodistal truncation in *angularis*, with anterior and posterior corners almost equally truncated in *litoreus*), the length and direction of the proximal seta on the tarsus of leg 9 (almost erect and 0.3-0.4 of length of tarsus, not depressed and 0.6 of length of tarsus), the relative lengths of the setae a_1 and a_2 of the pygidial tergum ($a_2<a_3$, not $a_2>a_3$) and by the shape of the posterior margin of the anal plate (very small posteromedian indentation between the appendages; not distinct U-shaped).

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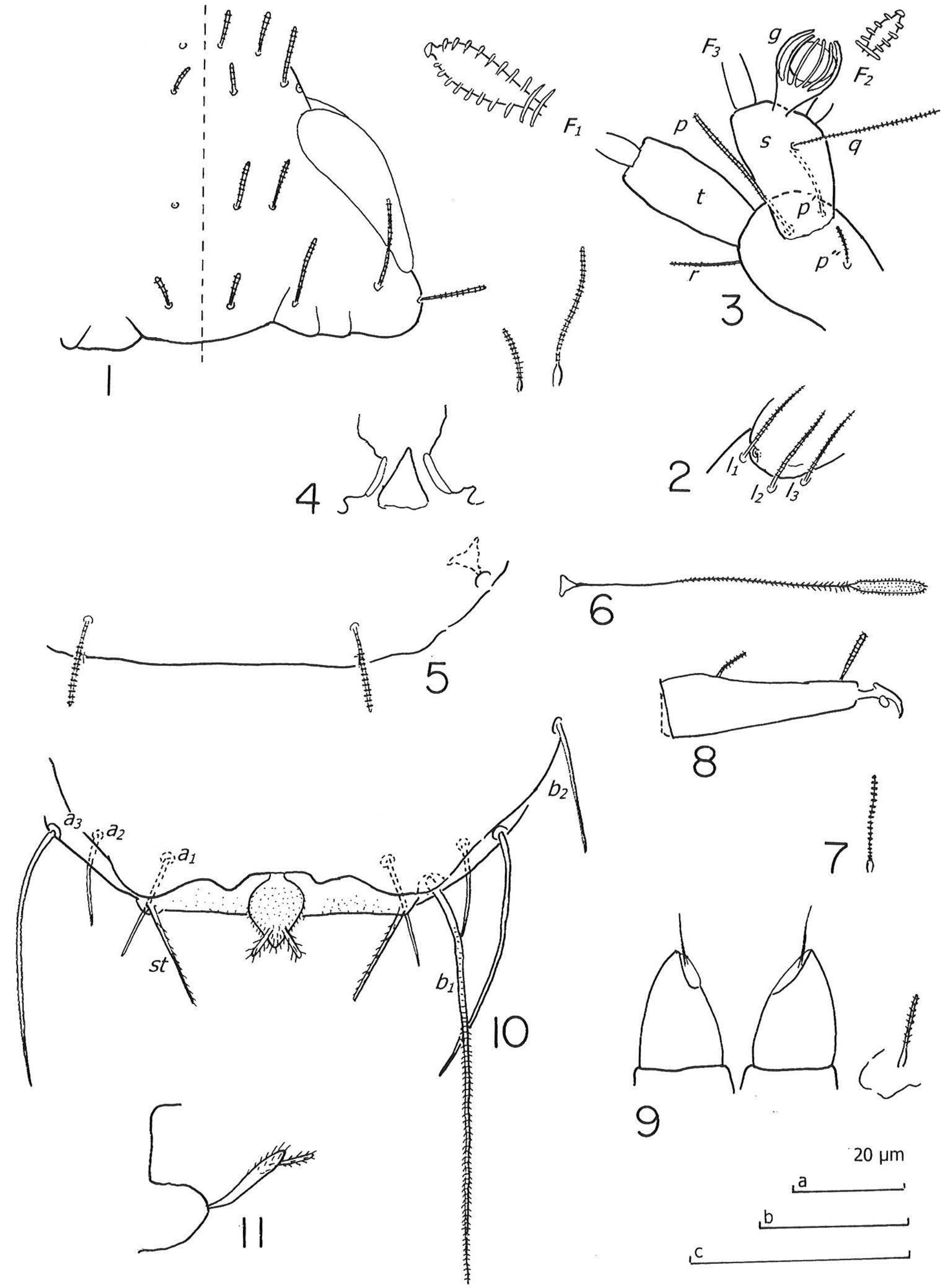
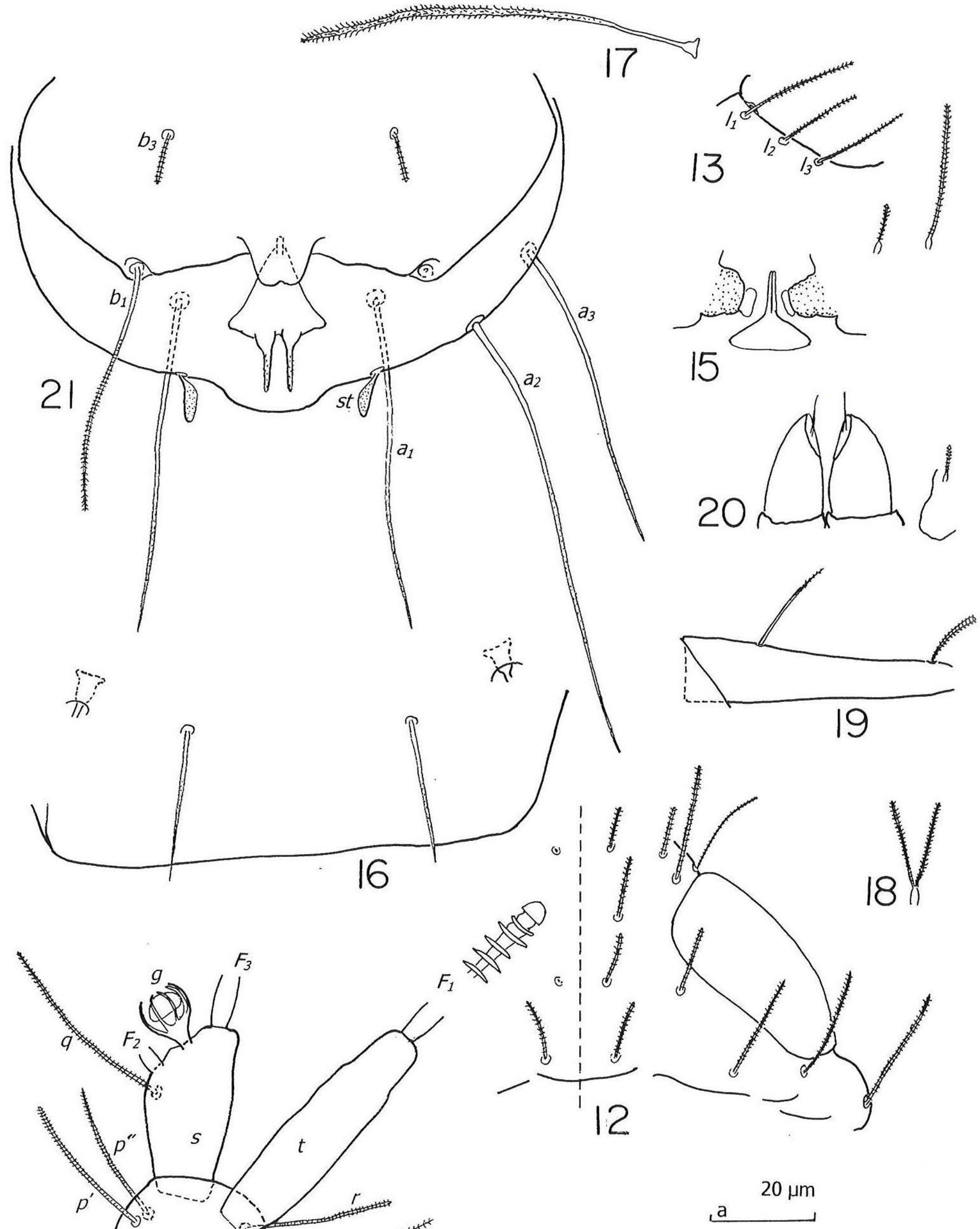


Figs. 1-11:
Allopauropus janauariensis n.sp., holotype.
1: Head, median and right part, tergal view. **2**: Temporal organ, posterior part, right side, lateral view. **3**: Right antenna, sternal view. **4**: Collum segment, median and left part, sternal view. **5**: Tergite VI, posteromedian and right posterior part. **6**: T_3. **7**: Seta on trochanter of leg 9. **8**: Tarsus of leg 9. **9**: Genital papillae and seta on coxa of leg 2, anterior view. **10**: Pygidium, posteromedian and left posterior part, sternal view. **11**: Anal plate, lateral view. Scale a: 6; b: 1, 2, 4, 7-9; c: 3, 5, 10, 11.



Figs. 12-21:

Scleropauropus angularis n.sp., 12-19, 21 holotype, 20 paratype.

12: Head, median and right part, tergal view. **13**: Temporal organ, posterior part, right side, lateral view. **14**: Right antenna, tergal view. **15**: Collum segment, median and left part, sternal view. **16**: Tergite VI, posterior part. **17**: T_3. **18**: Seta on trochanter of leg 9. **19**: Tarsus of leg 9. **20**: Genital papillae and seta on coxa of leg 2, anterior view. **21**: Pygidium, sternal view. Scale a: 17, 20; b: 12, 13, 15, 16, 18, 19; c: 14, 21.